

CLAIMS

What is claimed is:

1. (Currently amended) A nucleic acid sequence comprising:

P_x-S_x-B_n-(ZR)-transport peptide-(Z₁Z₂)-protein(Y)-(Z₁Z₂)-protein(Y_m)-T;

wherein:

the nucleic acid codes for a fusion protein comprising a peptide encoded by transport peptide linked via a peptide encoded by a first Z₁Z₂ to a protein encoded by said protein(Y), which is linked to T when m equals zero, or when m does not equal zero, is linked to a peptide encoded by a second Z₁Z₂ which is linked to a chain comprising at least one and up to 5 proteins encoded by protein(Y_m), which either correspond to the protein encoded by said protein(Y) or can be different from the protein encoded by said protein(Y);

the peptide encoded by transport peptide improves the rate of secretion of the protein encoded by said protein(Y) and the protein encoded by said protein(Y_m), when the protein encoded by said protein(Y_m) is present;

P_x comprises a promoter sequence;

S_x comprises a nucleic acid sequence encoding a signal or leader sequence;

B_n is 1 to 15 codons, when n is an integer from 1 to 15, or a chemical bond, when n=0;

Z is a codon for lysine or arginine;

R is an arginine codon;

transport peptide comprises a nucleic acid sequence encoding a peptide that is transported across membranes;

Z₁ is a codon for lysine or arginine or a portion or a chemical bond when Z₁ and Z₂ combine to make the second Z₁Z₂ and m =0;

Z₂ is a codon for lysine or arginine or a portion or a chemical bond when Z₁ and Z₂ combine to make the second Z₁Z₂ and m =0;

protein(Y_m) comprises a nucleic acid sequence encoding at least one and up to 5 proteins that are produced and secreted by yeast when m is an integer from 1 to 5, or is a chemical bond when m=0;

protein(Y) comprises a nucleic acid sequence encoding a protein that is produced and secreted by yeast and whose biological activity, when protein(Y_m) is not a chemical bond, is not impaired by a basic dipeptide extension encoded by the first or second Z₁Z₂ or allows degradation of the basic dipeptide extension by carboxypeptidase; and

T is an untranslated expression-enhancing nucleic acid sequence.

2. (Currently amended) The nucleic acid of claim 1, wherein the transport peptide encodes for hirudin ~~or hirudin derivative~~.

3. (Currently amended) The nucleic acid of claim 1, wherein protein(Y) encodes for ~~one of a protein selected from the group consisting of mini-proinsulin, proinsulin, proinsulin derivative, interleukin, lymphokine, interferon[[],] and blood clotting factor, blood clotting factor derivative.~~

Claims 4 and 5. (Cancelled).

6. (Original) A multicopy vector comprising the nucleic acid of claim 1.

7. (Original) A plasmid comprising the nucleic acid of claim 1.

8. (Original) A host cell comprising the nucleic acid of claim 1 as a part of the host cell chromosome, as a part of a mini-chromosome, or extra-chromosomally.

9. (Original) The host cell of claim 8, wherein the host cell is a yeast.

10. (Original) The host cell of 9, wherein the yeast is selected from *Saccharomyces cerevisiae*, *Kluyveromyces factis*, *Hansenula polymorpha*, and *Pichia pastoris*.

11. (Original) A host cell comprising the multicopy vector of claim 6.

12. (Original) A host cell comprising the plasmid of claim 7.

Claims 13-20. (Cancelled)

A multicopy vector comprising the nucleic acid of claim 1.

21. (New) A plasmid comprising the nucleic acid of claim 3.

22. (New) A host cell comprising the nucleic acid of claim 3 as a part of the host cell chromosome, as a part of a mini-chromosome, or extra-chromosomally.

23. (New) The host cell of claim 22, wherein the host cell is a yeast.

24. (New) The host cell of 23, wherein the yeast is selected from *Saccharomyces cerevisiae*, *Kluyveromyces factis*, *Hansenula polymorpha*, and *Pichia pastoris*.

25. (New) A host cell comprising the multicopy vector of claim 21.

26. (New) A host cell comprising the plasmid of claim 22.